

## MultiRAE as an Ambient Air VOC Monitor

The multiRAE is a handheld screening instrument primarily intended for use where hazardous atmospheres with reduced oxygen levels and/or explosive atmospheres are potentially present. These situations typically include first-responders to hazmat incidents, confined space operations, and initial entries into environments such as dump sites or abandoned facilities with unknown chemical hazards. The multiRAE is useful in these situations to give personnel carrying the instrument real-time information about the hazards in their immediate vicinity, so that they may conduct activities safely.

The two hazards uniquely sensed by the multiRAE (among the various RAE instruments being deployed), low oxygen and explosive atmospheres, only exist in confined spaces or within concentrated airborne chemical or pollutant plumes. These hazards are not of concern in ambient air, which by definition is not within a confined space or within a plume from a chemical release, fire, or similar source. The current ambient air monitoring stations where the VOC, particulate, and PAH monitoring and sampling equipment is deployed are open, well-ventilated areas where hazardous atmospheres are not anticipated. A large scale area with diminished oxygen or an explosive atmosphere is simply not a realistic scenario at our inshore monitoring stations as a result of an offshore oil spill.

The objective of VOC monitoring at these locations is to provide real-time indications of any potential significant changes in air quality based on VOC concentrations.

The multiRAEs are designed to simultaneously detect several things at once in a hazardous response setting, where the goal is to put as much information as possible into a responder's hand. As such, the multiRAE VOC detection system is by necessity less optimized for detecting VOC than a dedicated stand-alone PID. It performs well for its intended portable use over short periods in hazardous atmospheres. However, it is not tolerant of changing weather conditions or of being run continuously. In addition, the multiRAEs are providing only archived data between downloads, as opposed to the real-time data desired to track air quality.

For ambient air VOC monitoring, the most desirable instrument is a single-detector unit that is more stable and tolerant of continuous operation. It should also be compatible with a real-time data telemetry system. The miniRAE fits these criteria. Its PID detection system is similar to that of the multiRAE, but its design is optimized for longer-term operation (e.g., measuring time weighted average exposures in workplace settings). In addition, the miniRAE is a newer design that is more stable and tolerant of moisture and other interferences. The miniRAE also provides an analog output for use with the real-time telemetry system. The real-time telemetry system being used for the PM10 & miniRAE VOC monitoring is based on data loggers accepting inputs from any sensors with suitable outputs. The system is cellular modem based, so is not limited by line-of-sight requirements of radio telemetry. The data loggers in the system are being automatically polled and displayed remotely from multiple command center locations in real time via internet, meeting the objective of real-time indication of air quality conditions, whereas oxygen and LEL data is downloaded by hand at each field site and then uploaded at the station to provide data as much as 12 to 14 hours old.

The current objective of providing real-time VOC concentration data is being adequately met by the miniRAEs. Therefore, the use of other PID-based VOC monitors is redundant and should be discontinued. The multiRAE oxygen (O<sub>2</sub>), Carbon Monoxide (CO), and lower explosive limit (LEL) data are not useful for ambient air monitoring, and these hazards are simply not relevant to the present

situation. Considerable effort is being expended to prevent the multiRAEs from producing erroneous data, and explaining erroneous data when it occurs, and their use should be discontinued.